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Cheong 5-1



**IN THE UNITED STATES  
PATENT AND TRADEMARK OFFICE**

**PATENT APPLICATION**

5 **INVENTORS:** Sang-Wook Cheong  
Namjung Hur

**CASE: 5-1**

**Serial No.: 09/885,471**

**Group Art Unit: 1762**

**Filed:** June 20, 2001

**Title:** MgB<sub>2</sub> Superconductors

10 **Commissioner for Patents**  
**P.O. Box 1450**  
**Alexandria, VA 22313-1450**

**SIR:**

15 **SUPPLEMENTAL DECLARATION UNDER 37 C.F.R. 1.131**

We the Declarants, Sang-Wook Cheong and Namjung Hur, state that:

1. On Aug. 28, 2003, we signed a Declaration under 37 C.F.R. 1.131 for submission along  
20 with supporting Exhibits 1 – 4 in the above-referenced patent application. Herein, our  
Declaration of Aug. 28, 2003 is referred to as Our Earlier Declaration.

2. Paragraph 14 of Our Earlier Declaration describes experiments performed by Nanjung  
Hur to obtain pellets of MgBr<sub>2</sub> and associated Sample and Machine Log Notebook pages of  
25 Exhibits 2 and 3. A copy of one of these Notebook pages is attached Exhibit B and was dated  
Feb. 27, 2001 by Mr. Hur. A copy of the other of these Notebook pages is attached Exhibit C  
and was dated Feb. 28, 2001 by Mr. Hur. Mr. Hur prepared both Notebook pages in the U.S.A.

3. With respect to paragraphs 13 – 15 of Our Earlier Declaration, attached Exhibits D and E  
30 show other pages from Mr. Hur's Machine Log Notebook. Mr. Hur prepared both Notebook  
pages in the U.S.A. Exhibit D is a copy of a page of the Notebook that Mr. Hur dated Mar. 1,  
2001. The page records preparations by Mr. Hur on sample BB 146 for obtaining an MgBr<sub>2</sub>

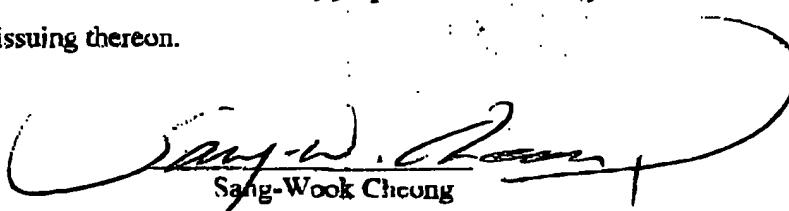
**Cheong 5-1**

pellet. Exhibit E is a copy of a page of the Notebook that Mr. Hur dated March 2, 2001. The page records preparations by Mr. Hur on sample BB 147 for obtaining an MgBr<sub>2</sub> pellet.

4. Herein, we certify that all statements made of our own knowledge are true and that all  
5 statements made on information and belief are believed to be true. We also understand that  
willful false statements and the like are punishable by fine, imprisonment or both under 18  
U.S.C. 1001 and that willful false statements and the like may jeopardize the validity of the  
application-at-issue or any patent issuing thereon.

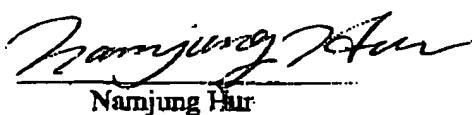
10

Date: June 24, 2004

  
Sang-Wook Cheong

15

Date: June 24, 2004

  
Namjung Hur

70

2/27/01

NH93 MgB<sub>2</sub>

Isotope "B"  
 actual  
 Mg-  
 24.811 B-  
 10.811

Mg 24.312 1.02 (1.1734)

B 10.811 2 1.0231

$$B \rightarrow \frac{10.811}{24.312} \times \frac{2}{3} \times C = 0.27192 \times (1.1734)$$

LF1700

RT  $\xrightarrow[100^{\circ}\text{C}/\text{L}]{}$  600°C 1h  $\xrightarrow[100^{\circ}\text{C}/\text{L}]{}$  800°C 1h  $\xrightarrow[100^{\circ}\text{C}/\text{L}]{}$  920°C  $\xrightarrow[100^{\circ}\text{C}/\text{L}]{}$  RT

open  $\xrightarrow{}$  gate

w variable  $\rightarrow$  High pressure



Isotope B

NH94 MgB<sub>2</sub> close growth

Mg 24.312 2 (1.8293)

B 10.811 1 0.4067

$$B \rightarrow \frac{10.811}{24.312} \times \frac{1}{3} \times C = 0.22234 \times (1.8293)$$



RT  $\xrightarrow[100^{\circ}\text{C}/\text{L}]{}$  1020°C  $\xrightarrow[40^{\circ}\text{C}/\text{L}]{0.5}$  923  $\xrightarrow[\text{f.c.}]{}$  RT forming gas flow

(Ar + H<sub>2</sub>)

#### EXHIBIT B

2<sup>nd</sup> Supplemental Declaration under 1.131

Patent Application No.: 09/985,471

Filed: June 20, 2001

Inventors: Sang-Wook Cheong et al

Jun-24-2004 12:08pm From-Dept. of Physics & Astronomy

732-445-4343

T-706 P.005/007 F-748

Aug-04-2003 00:57am From-Dept. of Physics & Astronomy

732-445-4343

T-128 P.008/014 F-882

UF

4

3/18/04 08:14:55 NH43 MgB<sub>2</sub>

B18

(3/4") part Upper ram 3350  
Lower ram 2200

T=400°C U.R. 6100

L.R. 5500

T=350°C U.R. 6200

L.R. 5500

KI → 400°C <sup>0.22</sup> <sub>100°C/L</sub> → 350°C <sup>1/4"</sup> <sub>FC</sub> → RT

Final - 80°C + U.R. 5550

L.R. 2650

~~80°C~~

### EXHIBIT C

2<sup>nd</sup> Supplemental Declaration under 1.131

Patent Application No.: 09/885,471

Filed: June 20, 2001

Inventors: Sang-Wook Cheong et al

Jun-24-2004 12:08pm From-Dept. of Physics & Astronomy  
Aug-04-2003 09:58am From-Dept. of Physics & Astronomy

732-445-4343

732-445-4343

T-706 P.006/007 F-748

T-128 P.009/014 F-802

6

3/1/01 BR 146

HgB<sub>2</sub> (Alpha)

CB 2

(3/1/K) T = RT UR 3000  
LR 2000

T = 400°C UR 6200  
LR 5500

T = 350°C UR 1500  
LR 1400

T = 300°C UR 6100  
LR 3300

RT → 400°C <sup>out</sup> → 850°C <sup>in</sup> → AT  
1000°C LR 100°C/L f ←

EXHIBIT D

2<sup>nd</sup> Supplemental Declaration under 1.131

Patent Application No.: 09/885,471

Filed: June 20, 2001

Inventors: Sang-Wook Cheong et al

Jun-24-2004 12:08pm From-Dept. of Physics & Astronomy

732-445-4343

T-706 P.007/007 F-748

Aug-04-2003 08:58pm From-Dept. of Physics & Astronomy

732-445-4343

T-123 P.010/014 F-802

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3/2/01 BB147

MgB<sub>2</sub> (Al<sup>60</sup>)

(3/4")

T=RT UR 3100

LR 2000

Final : 41°C : UR 6300

LR 9200

RT → 400°C → 0.2L  
high 1000°C/hr 2K → FC

**EXHIBIT E**

2<sup>nd</sup> Supplemental Declaration under 1.131

Patent Application No.: 09/885,471

Filed: June 20, 2001

Inventors: Sang-Wook Cheong et al